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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,437	12/10/2001	Nader Dutta	594-25576	5333
7590	02/24/2006		EXAMINER	JONES, HUGH M.
Jeffrey E. Griffin WesternGeco Intellectual Property Department 10001 Richmond Ave. Houston, TX 77042			ART UNIT	PAPER NUMBER
			2128	

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/016,437	DUTTA ET AL.	
	<b>Examiner</b> Hugh Jones	<b>Art Unit</b> 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 23 November 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-27 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 10 December 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

1. Claims 1-27 of U. S. Application 10/016,437, filed 12/10/2001, are presented for examination.

### Information Disclosure Statement

2. Applicants have not provided an information disclosure statement. However, it is noted that Inventor Mallick has an extensive publication record in the art which has been claimed including the application of genetic algorithms to prestack wavefrom inversion, none of which has been provided to the office. Applicants are reminded of their duty to disclose under 1.56 and 1.105.
3. It is noted that Applicants have not acknowledged this section in their response. It is assumed that this was an unintentional oversight. However, the Application will be held non-responsive in the next occurrence.

### Drawings

4. Figure 2-8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office

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action. The objection to the drawings will not be held in abeyance. For example, Fig. 5 is exactly identical to Figure 1 of Mallick (1999).

**Oath/Declaration**

5. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because: the affidavit raises a question about the inventorship. Clarification is required.

**Claim Rejections - 35 USC § 102**

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (f) he did not himself invent the subject matter sought to be patented.

7. Claims 1-27 are rejected under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter. See the statements in the affidavit.

8. Claims 1-27 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Mallick (6/2001).

9. Mallick (one of the inventors) discloses prestack waveform inversion using a genetic algorithm including:

a method for determining shallow water flow risk using seismic data

comprising (abstract; SWF – pg. 81, col. 2; page 82, col. 1; fig. 12):

processing the seismic data to enhance its stratigraphic resolution (“Prestack Waveform Inversion” and “Applications of Prestack Waveform Inversion” pp. 79-82);

selecting a control location comprising:

performing a stratigraphic analysis on the seismic data (abstract; “Prestack Waveform Inversion” and “Applications of Prestack Waveform Inversion” pp. 79-82; pg. 80, col. 2); and

evaluating the seismic attributes of the seismic data (“Prestack Waveform Inversion” and “Applications of Prestack Waveform Inversion” pp. 79-82);

applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity (“Prestack Waveform Inversion” and “Applications of Prestack Waveform Inversion” pp. 79-82); and

applying a post-stack inversion on the seismic data using the elastic model (“Prestack Waveform Inversion” and “Applications of Prestack Waveform Inversion” pp. 79-82); and determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity (“Prestack Waveform Inversion” and “Applications of Prestack Waveform Inversion” pp. 79-82).

wherein the pre-stack waveform inversion comprises using a genetic algorithm comprising:

generating a plurality of elastic earth models (pg. 79),

generating pre-stack synthetic seismograms for the elastic earth models (pg. 79);

matching the generated seismograms with the seismic data ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82);

generating a fitness for the elastic earth models (pg. 79);

genetically reproducing the elastic earth models using the fitness for the elastic earth models (pg. 79), and

determining convergence of the reproduced elastic earth models to select the elastic model ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82),

wherein processing the seismic data comprises using an algorithm with amplitude preserving flow (bottom of col. 2, page 81),

wherein the elastic model further comprises attribute of Poisson's ratio (fig. 10),

wherein the control location comprises a plurality of control locations (pg. 81; "Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82),

wherein performing the stratigraphic analysis comprises using the model to identify a geologic feature ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82),

wherein evaluating seismic attributes comprises using AVO techniques (abstract; pg. 80, col. 2).

**Claim Rejections - 35 USC § 103**

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1-5, 7-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Mallick (3/1999) in view of Huffman.

13. Mallick discloses all limitations, as subsequently discussed, but does not expressly disclose the application of the technique to Shallow Water Flow (SWF).

14. Huffman discloses a method for identification of shallow water flow hazards using seismic data (see title), using the same types of techniques.

15. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Mallick teaching to include the Huffman teaching because Huffman disclose in the "background of the art" that there is a need to identify SWF prior to drilling a borehole.

16. Specifically, Mallick discloses:

a method for determining shallow water flow risk using seismic data comprising ("Genetic Algorithm – a Practical Implementation – pp. 326-330):

processing the seismic data to enhance its stratigraphic resolution ("Genetic Algorithm – a Practical Implementation – pp. 326-330);  
selecting a control location comprising:

performing a stratigraphic analysis on the seismic data ("Genetic Algorithm – a Practical Implementation – pp. 326-330); and

evaluating the seismic attributes of the seismic data ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity ("Genetic Algorithm – a Practical Implementation – pp. 326-330); and

applying a post-stack inversion on the seismic data using the elastic model; and determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity ("Genetic Algorithm – a Practical Implementation – pp. 326-330).

wherein the pre-stack waveform inversion comprises using a genetic algorithm ("Genetic Algorithm – a Practical Implementation – pp. 326-330) comprising:

generating a plurality of elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330),

generating pre-stack synthetic seismograms for the elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

matching the generated seismograms with the seismic data ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

generating a fitness for the elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

genetically reproducing the elastic earth models using the fitness for the elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330), and

determining convergence of the reproduced elastic earth models to select the elastic model ("Genetic Algorithm – a Practical Implementation – pp. 326-330),

wherein processing the seismic data comprises using an algorithm with amplitude preserving flow ("Genetic Algorithm – a Practical Implementation – pp. 326-330),

wherein the elastic model further comprises attribute of Poisson's ratio (pg. 330, col. 2),

wherein the control location comprises a plurality of control locations (pg. 330),

wherein performing the stratigraphic analysis comprises using the model to identify a geologic feature ("Genetic Algorithm – a Practical Implementation – pp. 326-330).

wherein evaluating seismic attributes comprises using AVO techniques ("Genetic Algorithm – a Practical Implementation – pp. 326-330).

17. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mallick (3/1999) in view of Huffman and in further view of Tygel et al..

18. Mallick discloses all limitations, as discussed, but does not expressly disclose the use of amplitude preserving techniques.

19. Tygel et al. discloses the use of amplitude preserving techniques (page 945, top of middle column).

20. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Mallick teaching to incorporate the Tygel et al. teaching because Tygel et al. disclose that the use of amplitude preserving techniques reduce the deleterious effects of aliasing (page 945, top of middle column), in the same context.

**Response to Arguments**

21. Applicant's arguments, filed 11/23/2005 have been carefully considered, but are not persuasive.

22. It is noted that all of the issues raised in the last office action were not addressed or acknowledged. It is in the interests of compact prosecution to address all issues in a timely manner. Further occurrences will be held non-responsive.

23. It is noted that Applicants have not acknowledged the section of the last action directed to information disclosure in their response. It is assumed that this was an unintentional oversight.

24. With respect to a "prior art" label, for the drawings, Applicants have complied with respect to figure 1. Applicants have only argued against figure 5. It appears that Applicants have acquiesced to the finding of prior art status of the other figures by their silence. With respect to figure 5, Applicants are correct that figure 1 of Mallack 1995 is

not the same. The Examiner apologizes or the typo. However, the figure is identical to figure 1 of Mallick 1999, which was applied in a 103 rejection, and so *the reference was before Applicants. Applicants are reminded that the author of the 1999 paper is one of the inventors.*

25. Applicants are thanked for their amendment to traverse the 112 rejections; said rejections are therefore withdrawn.

26. The affidavit is acknowledged. However, the rejection remains for the following reasons. The affidavit raises the issue of whether the oath is defective (due to inventorship) and whether there are 102(f) issues. The affidavit states that the referenced paper discloses the subject matter recited in all the claims. However, the inventive entity includes more than the one inventor. It also states that the author of the affidavit is an inventor of the same claims. Thus, the statements in the affidavit appear to be in conflict. The rejection will remain until the issues are resolved. In any case the inventive entity is not identical to the authorship of said paper. Clarification is required. A 1.105 requirement for information is not being made at this time.

27. Applicants arguments relating to the 103 rejections are not persuasive. Applicants are reminded that the Poisson's ratio is the well known ratio between pressure and shear waves. This ratio is disclosed in both references. For example, see left hand column, top of page 329 of Mallick (*one of the inventors*) and col. 6, lines 6-20, col. 6 of Huffman. The definition is attached to this action for Applicants convenience.

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**Conclusion**

**28. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

**29.** A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**30. Any inquiry concerning this communication or earlier communications from the examiner should be:**

directed to: Dr. Hugh Jones telephone number (571) 272-3781,

Monday-Thursday 0830 to 0700 ET,

**or**

the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

**mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

(703) 308-9051 (for formal communications intended for entry)

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**or (703) 308-1396 (for informal or draft communications, please label PROPOSED or DRAFT).**

Dr. Hugh Jones  
Primary Patent Examiner  
February 17, 2006



A handwritten signature in black ink, appearing to read "HUGH JONES Ph.D.", is overlaid on a printed name and title. The printed text reads "PRIMARY PATENT EXAMINER TECHNOLOGY CENTER 2100".